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Evidence-based practice (EBP), means-end reasoning and goal-directed theories

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ABSTRACT: Means-end reasoning – deliberations concerning what to do to attain a goal – is at the heart of EBP and practical pedagogy in general, but beset by many misunderstandings. In this paper I discuss the form of means-end reasoning involved in EBP. I bring out its basic features by first comparing it to David Hitchcock's complex means-end scheme and then to the notion of goal-directed theories. Which approach, if any, best accommodates the means-end reasoning of EBP?

KEYWORDS: causality, constitution, EBP, ends, goal-directed theory, instrumentality, means, necessity, reasoning scheme, sufficiency

1. INTRODUCTION

Evidence-based practice (EBP) is known as the *what works agenda*. There are different definitions of it, or perhaps it is better to say that there are different views of what belongs to its “core” and what its more accidental properties are. I shall in this paper employ a minimalist definition: EBP says we should use the best available evidence to produce the best possible results for our clients (and for society). In other words, we need to know what works. In education, the growth of EBP is strongly tied to government wishes for improved school results, and thereby also to research into what works; that is, into what to do to attain desirable goals.

To say that something, e.g. a teaching method, *works*, is roughly to say that it has the desired effect. If the effect is undesirable, we tend to say that the method does not work, and if there is no detectable effect we likewise judge that the method does not work. The effectiveness of the method is thus measured by the degree to which it contributes to goal attainment. If we have a high correlation between factual and desired outcome, we deem that the teaching is effective (and probably that the teacher is a good one). Assessment of results is thus integral to EBP.

Research in education, EBP adherents claim, should therefore aim at finding which methods or interventions that work and/or how well they work in practice (e.g. Hargreaves, 1996). This is already a matter of some contention: should research be in the service of aims set by politicians or should it be free. I shall side-step that discussion and instead simply note that EBP, according to the minimalist definition, indeed is in the service of various aims. This means that EBP at the outset

has a certain instrumental flavor to it, and the job of the research is to find the best *means* to attain those aims, effectively and perhaps efficiently too. It is important to note here that the *means* is not identical to the evidence. In education (and I suspect elsewhere) the EBP debate is plagued by confusion about what evidence is and what it does. Suffice it here to point out that the means in question is a method of instruction or a teaching strategy or some such thing. The evidence is that which speaks to its claim to effectiveness (see Kvernbekk, 2011 for a discussion of the concept of evidence). The job of the evidence is thus to show which method is the more effective (if we have several alternatives) or how effective our method of choice is. The evidence comprises data which speak to the effectiveness of the method. Typically such data consist of various student test results showing differences between test group and control group.

It is important in EBP that the evidence we base our practice on be produced by research rather than, say, personal experience. The so-called hierarchy of evidence – with quantitative data from randomized controlled trials (RCT) on top and other forms of evidence as “weaker”, even negligible – has been the subject of much criticism, and rightly so. Nevertheless, the hierarchy does have a justification: evidence speaks to the effectiveness of our methods, and we must be able to trust it. And RCT is widely thought of as the gold standard because it (ideally) ensures that the difference between groups can only be explained by the fact that they got a different “treatment” – all other factors are controlled for. RCT evidence thus gives good reason to believe that our causal inferences are true: the treatment is the cause of the effect.

Since RCTs deal in relations between causes and effects in general, we must tweak them a little to put them into a practical means-end framework. They both take on new roles and new values: as means and end respectively. Or, possibly, as means and intermediate goal on the path toward final goal. At the outset, the job of EBP in education is as follows (this at least applies to countries like my own, where we have a national curriculum): we have a set of pre-determined goals; the researchers should find the best means to achieve them. This is classical means-end reasoning. But how is the relationship of means to end conceived of in EBP, beyond – as I have indicated – mainly being seen as causal? There are many ways of understanding this relation. A foray into this issue might shed light not only on EBP, but perhaps even more so on educational thought in general, which has a very ambiguous relationship to means-end reasoning.

2. WHAT IS WRONG WITH MEANS AND ENDS IN EDUCATION?

The fate of means-end reasoning in education has long fascinated me. On the one hand, it is at the heart of practical pedagogy. Schools are institutions with a purpose, and at least most educational situations are characterized by intentionality: there are certain goals that we want our students to achieve. On the other hand, it has been subjected to much criticism by educators, and some have suggested it should be rejected altogether. So what is wrong with it? A brief inquiry might be useful.

Let me begin by citing Ralph Tyler's rationale for understanding and constructing instructional programs (Tyler, 1949). This rationale is widely held to embody the bare essence of means-end reasoning (Tyler, 1949, p. 1):

- (1) What educational purposes should the school seek to attain?
- (2) What educational experiences can be provided that are likely to attain these purposes?
- (3) How can these educational experiences be effectively organized?
- (4) How can we determine whether these purposes are being attained?

First, we should notice here that this is evidently means-end reasoning. The goal provides the criteria for selecting means (materials, method of instruction, student activity, etc.), and we evaluate to see if the goal has been achieved. Means-end reasoning in practical pedagogy thus is a systematic approach which aims at maximizing the probability of goal achievement. If Tyler had added a sentence to the effect that the educational experiences and their organization should be research based, his rationale would have encapsulated the minimalist definition of EBP; goal, means and assessment.

In all systems that are managed by objectives, such as schools, some form of result control is important. This in turn restrains the formulation of goals, even if we join Tyler in insisting that the goal should come first and provide criteria for choice of means. If objectives are too general, for example "To develop social attitudes", it becomes impossible to devise a suitable program of instruction and it becomes impossible to test to see whether our goal has been achieved. Hence, Tyler says, "The most useful form for stating objectives is to express them in terms which identify both the kind of behavior to be developed in the student and the content or area in life in which this behavior is to operate" (1949, pp. 46-47). Nowadays we call this 'goals in behavioral terms' and it is employed even in universities – the rationale behind it being that if goals are precise, we can measure the results and see to what degree they have been achieved.

Much criticism has been leveled at EBP for operating with narrow goals of this type, and for serving to force all educational goals into this narrow frame. If it is not measurable, it does not count. This problem has been around for much longer than EBP (the term was coined in the mid-1990s), but there can be no doubt that EBP reinforces this trend. Many critics see it as a problem that the goals are pre-determined (e.g. Biesta, 2007), since that means that teachers have no say in setting them and are given no opportunity to influence or even discuss them. This is true, but it is not clear how much of a problem it is. Many countries have national curricula; in my country it is passed by the parliament. Historically, this has been the standard division of labor between politicians and teachers – politicians set the aims, teachers find the means; the normative and the empirical neatly separated. But with the growth of EBP, two things might happen here. First, the importance accorded to empirical research might feed back to the process of setting aims (e.g. in curriculum revisions), such that we formulate aims in terms of those effects that research has shown to be possible, rather than what we at the outset think would be desirable. Second, teachers are not even left the task of finding the means – research has found

it for them. It is something of a paradox, perhaps, that this is viewed as a problem, since both educators, politicians and educational researchers want research to contribute to and improve practice. The criticism largely centers on possible consequences of this for the professionalism of teachers; how the complex character of teaching is reduced to (technical) efficiency and the role of judgment diminished or eliminated altogether (e.g. Biesta, 2007; Carr, 1992; Davies, 2003; Hammersley, 1997; Sanderson, 2003). I am, however, not going to enter this debate; I am instead going to look at the relation of means to ends, which is also deemed to be problematic.

Let us go back to the highly politicized 1970s, when an approach to instruction called 'educational technology' was developed. It was thought to epitomize means-end pedagogy and thus make instruction more time- and cost-effective – its parents are behaviorism, managerialism and test psychology (Nordkvelle, 2004). The criticism that hit educational technology also hit means-end pedagogy, and looking into it is worthwhile because the criticism still rubs off. Where do means-end relations come from, Norwegian philosopher Hans Skjervheim asks (Skjervheim, 1969, 1992 [1972]). Drawing on Habermas, he claims that they originate in a technical knowledge interest to control and predict human behavior. The empirical correlate of means-end statements are causal 'if x, then y' claims. If y is something we want, we transform the causal statement to a technical imperative: do x! This kind of blatant instrumentality is typical of the natural sciences, he claims, whose theory-practice relationship is mediated by such technical imperatives. In the social realm we formulate technical imperatives on the basis of pre-determined goals. The knowledge interest remains the same: to predict and control behavior. Actions springing from means-end reasoning are therefore instrumental and technical; we have a "goal, and a calculation, based on more or less verified experimental knowledge, which gives directions for how the goal can be achieved" (1992, p. 175, my translation). This critique had a huge impact, and some of it we still find in educational thinking today (although I do not wish to argue that all criticism of EBP and means-end pedagogy can be traced back to Skjervheim). The derogatory use of term 'technical'; as when both Gert Biesta (2007) and Martyn Hammersley (1997) accuse EBP of reducing all professional action to technical action; the means-end relation as positivist; causal and therefore possible to use to manipulate students and control their behavior; the inherent reification of students, the mechanical nature of the implied pedagogy and its dehumanizing effects.

Yngve Nordkvelle (2004) argues that while the critique was devastating and deeply affected Nordic educational thought, it was not particularly sophisticated. Both Skjervheim and his successors had an impoverished and skewed understanding of technology – in the mental climate of the 1970s technology was seen as anti-democratic, inhuman and alienating. But we see that Skjervheim also makes other assumptions about means and ends, which are more pertinent to my purposes here.

First, the whole means-end conception indicates a degree of instrumentality in education that Skjervheim finds alarming. Nothing is done for its own sake, always for something else that might lie far into the future. Education runs the risk of being thoroughly instrumentalized (although he admits that instrumentality does

have a place in education). Second, as already mentioned, he sees the relationship as causal. This for Skjervheim and many contemporary writers is bad enough in itself. One reason is that causality is seen as a physical entity belonging to the natural sciences and importing it would be a mistake in itself. Gert Biesta, for example, describes causality in terms of “physical ‘push and pull’” (2010, p. 497). They both argue that this is mistaken because the social sciences do not deal in causality but in complex webs of meaning and symbolic interactions. Another reason is that Skjervheim (1969) clearly thinks of causality in a way reminiscent of Carl Hempel’s formulation of a scientific law; if A, then always B. This is particularly interesting. It means that he attributes universality to the relationship: if S, then always R. If you employ means x in your classroom, the students will achieve goal y – always and without fail, and the road to all manner of manipulation and social engineering is wide open. The cause is thus thought to be sufficient for the effect, and we may wonder if Skjervheim would assume this of all means-end relations as a matter of definition. Interestingly, Biesta, writing some 40 years after Skjervheim, has the same view:

If we are indeed able to generate true and complete knowledge of how things are in the world and about the laws that govern the connections between things, then it should at some point be possible to say with certainty that when we do A, B will follow (2010, p. 494).

Skjervheim and Biesta both argue that since we have no lawlike connections in education, we have no room for causality. At best we have probable connections, and these, apparently, are not causal.

Third, Skjervheim assumes that the x-y relation is *basic*, in the sense that it operates independently of the structure of the world where it is implemented. The x-y (S-R, means-end) relation is universal and operates in the same way everywhere. This universality clearly presupposes two things: that the classrooms or schools where the means-end pedagogy is implemented are causally homogeneous, and that the causal relations in question are stable. But this is something we in principle cannot presuppose, argues Nancy Cartwright (2012). Causal regularities are not basic, the underlying causal structure is. Regularities rely on such causal structures for their very existence; they emerge from such structures. This viewpoint has thoroughgoing implications for the generalizability of evidence-based causal claims and instruction methods, but I will have to leave this issue untreated here.

To sum up: education has a difficult and ambiguous relationship to means-end reasoning. On the one hand it belongs in practical pedagogy; we do have goals for our students and we do want to know how to achieve them. On the other hand, if instrumental reasoning is all we have, education is reduced to technique and goal achievement is allowed to overshadow other important values. This is aggravated by the conception of the means-end relation as universal and causally sufficient relation. Taken together they pave the way for manipulation and reification of students. The question, of course, is whether this is a fair picture of means-end pedagogy, and whether it applies to EBP.

3. MEANS-END REASONING AND EBP

Means-end reasoning is a form of practical reasoning. Robert Audi (1991) describes it as an inferential process moving from having a problem about what to do or wanting something, via deliberating about how to achieve what one wants to forming the belief that doing x will help achieve the end. Finally, one acts on this judgment (p.4). More formally, the major premise represents the goal; the minor premise represents a belief about the relation of means (often an action) to end, and the conclusion is a judgment to perform the action in question (p.89).

On Audi's view conceptions of the means-end relation is thus found in the minor premise. Even a quick perusal of his book reveals that the relation may be more manifold than educators have imagined: it may be one of reciprocal determination, constitution or instrumentality; the latter can be further analyzed in terms of causal necessity or sufficiency, probability and possibility; means may be conceived as mandatory or permissible, simple or multiple.

3.1 Means as constitutive of end

Means as constitutive are closely connected to ends as intrinsic to the activity. This is the "for its own sake" approach, and many educators like to think of means this way. On this view, means do not contribute to an extrinsic goal; rather, implementing the means constitutes attaining the goal. For instance, Audi says, "preserving one's life out of the duty to do so is not an ordinary causal means to fulfilling that duty, but *constitutes* fulfilling it (1991, p. 67). It is not obvious that everybody would call this a case of means-end reasoning. David Hitchcock, for example, would not. He wishes to distinguish means-end reasoning from cases where the action is decided not on the basis of its consequences but on the basis of being, say, of a certain character,

[...] as when someone notices that a store clerk has neglected to charge them for an item and decides to bring the omission to the clerk's attention, on the ground that doing so is the honourable thing to do in the situation. Here mentioning the omission is not a means to behaving honourably, but is an *instance* of such behavior in concrete circumstances (2011, p. 2, my emphasis).

I take this to be the same as Audi's constitutive means. This is also the sort of means-end relationship that Gert Biesta (2007) and David Carr (1992) advocate. Biesta argues that EBP embodies the idea that practice is "a technological process in which there is a clear separation between means and ends, and in which it is assumed that the ends are given and the only relevant (professional and research) questions pertain to the most effective and efficient way of achieving those ends" (2007, p. 9). This shows that EBP is a bad model of educational practice, he claims, because "in education means and ends are not linked in a technological or external way but [...] are related *internally* or *constitutively*" (p. 10). This seems to mean for Biesta that the means are not neutral with respect to the ends we wish to achieve. This non-neutrality is cashed out in an example showing that the means employed

by the teacher teaches the students what is permissible to do, and the teacher should therefore act with great care: if you beat children to make them learn, they will also learn that violence is permissible. While I agree with that, there is something strange about the example, which he takes from David Carr. It does not seem to be an example of constitutive means in Audi's or Hitchcock's sense but rather an instance of learning by example. For what is the goal here? It seems that all of a sudden the teacher's action, which is the means, also *becomes* a goal (albeit unintentionally) just because the children learn from it. But for Audi and Hitchcock alike, the idea of constitutive means is that the goal is there first and the means *instantiates* it.

Now it may well be that a good many educative activities can be conceived to be cases where you cannot in practice distinguish between the end and the means. Examples would perhaps be activities done for their own sake. Biesta is surely right that EBP falls outside this conception of the means-end relationship. It does not take empirical (RCT) research to find means to an end if the means is to be constitutive of the end. While the minimalist definition of EBP allows for a great variety of evidence and x-y relationships, it is a general point in EBP that if you want to intervene in order to achieve some goal, you will want to know that your proposed intervention (means) actually works, and this requires controlled evaluation studies. The *what works* agenda does not sit well with means as constitutive; it makes no sense to ask if the means *works* if it is constitutive. But it does not follow that EBP has no place in education.

3.2 Means as instrumental to end

This is where we find EBP: means as instrumental to achievement of goal. In everyday life, means-end reasoning begins with selection of a goal. David Hitchcock (2011) suggests the following scheme for reasoning from goal to means:

Initiating intention of agent to bring about goal G. G is some desired future state of affairs that need not include the agent – as is the case in education, where the “agent” is the teacher and G concerns the students.

Immediate means premise: Means M1 would contribute to bringing about G, and it may or may not be an action

Achievability premise: M1 is achievable as a result of a causal sequence initiated by some agent in circumstances C. Achievability may be a matter of possibility or probability rather than universality.

Permissibility premise: M1 does not violate any applicable moral or institutional norms, at least not without adequate justification.

Alternative means premise: No other permissible means that would also contribute to G is preferable to M1.

Side effects premise: Possible side effects of M1 do not outweigh the expected benefit of achieving G.

Concluding decision: to bring about M1. M1 needs to be within the power of the relevant agent.

To begin with we should notice that this scheme is way more complex than the scheme envisioned by critics such as Skjervheim, Biesta or Carr. Let us look at

the premises that concern the means. First, it seems that they take for granted not only that M1 should contribute to bringing about G, but simply bring it about. The formulation 'contribution' indicates that M1 may not be the only means we need to attain G. This is not really discussed by Skjervheim or Biesta; they tend rather to attribute to means-end pedagogy a form of 'one end, one (sufficient) means' principle but without exemplifying or going into details.

The achievability premise is interesting. First, all agree that causality is involved, but they understand it differently and, I assume, judge its appropriateness differently. Both Skjervheim, Biesta and Carr all see causality as entering into lawlike connections and do not see causality as probabilistic, as Hitchcock allows for. The achievability of M1 (and of G, I suppose) is relativized to C. This might imply sensitivity on Hitchcock's part to what I above called an 'underlying causal structure' – M1 may work in C1 but perhaps not in C2 simply because the underlying structure does not support it, provides no path along which the effect of M1 can travel to G.

Causality is an issue that for some reason divides educators into 'for' and 'against' camps. Jay Wallace (2008), in his treatment of instrumental rationality, takes necessity to be fundamental to causality: "Instrumental rationality, in its most basic form, instructs agents to take those means that are necessary in relation to their given ends" (p. 7), and suggests that this is an unproblematic requirement of practical reason. Robert Audi, in his discussion about assessment of the minor premise, suggests that justifying the minor premise is easier if it is represented by the agent as necessary for the end, and thus agrees with Wallace that necessity is (relatively) unproblematic. But he does not agree with Wallace that it is basic, rather he says,

We commonly conclude practical reasoning in favor of actions that we do not take to be necessary conditions for realizing our end, but only regard as something like our best bet, or good, or adequate, for achieving this end (1991, p. 158).

It is not clear how we should understand this "best bet"; one might think it becomes a question of probability. But since Audi discusses the issue in terms of assessment of the minor premise, he just says that the question of the suitability of the means (an action) is comparative (presumably to other possible actions). Necessary means need not also be sufficient means, so that the goal may not be achieved even if one implements the means, as Hitchcock points out. It may well be that necessity is basic, in the sense that it is that which originates the causal sequence leading up to the goal. A sufficient means is a means that brings about its end. Audi holds a somewhat surprising view of causally sufficient means:

It may happen, however, and is likely to happen in cases of cautious reasoning, that the minor premise is only to the effect that the action is *sufficient* for the end. This is consistent with the action's being inferior even to readily available alternatives. On the other hand, it may be fairly easy to be justified in one's belief that a means is sufficient, provided one may presuppose necessary background conditions which can reasonably be taken for granted (1991, p. 158).

I admit to feeling confused about the “only” and the “inferior” in this quotation. Why should we think of a sufficient means as inferior to alternatives? David Hitchcock takes a very different view. When a means to one’s goal is not only necessary but sufficient and otherwise satisfies the criteria, “then one’s course is clear: One should adopt the means as one’s intermediate goal, and as a plan of action if one can implement it directly” (2011, p. 7).

Hitchcock’s view on causal sufficiency of means ties in nicely with what I take to be the educational interest here: in education surely the most important property of means is that it is sufficient and serves to bring about its end. It seems to me that means as instrumental largely comes down to sufficiency – a means that is instrumentally good and efficacious brings out its end. Neither Skjervheim nor Biesta distinguishes between necessity and sufficiency, but as argued above, I think they both tacitly presuppose that the means-end relation is one of sufficiency. This goes well together with the universality and stability of the relation, as well as with predictability. Unstable causal relations cannot be relied upon to produce the desired effect every time, nor do they provide a basis for predicting results (nor for “guaranteed” manipulation of behavior). Hence, they do not consider that the means-end relations could be conceived as probable either. But it can – on such an understanding, implementing M1 does not simply lead to G, but it may increase the probability for it. Probabilistic theories of causality are compatible with indeterminism and allow us to make use of causal notions in a wide range of contexts where the factors are many and the connections may be weak and/or difficult to grasp, such as in education. There are two main ways of understanding probability that pertain to the means-end relation. One is frequency; probably (sic) the most intuitive understanding of probability: means that sometimes bring about the end and sometimes not. This view is usually expressed in terms of the cause’s (the means) tendency to bring about the effect (the goal). Maybe this is what Audi refers to by “best bet”? When we speak about frequencies and tendencies we move at a general level, since the tendency persists independently of context. The second is gradation: we ask to what degree M1 brings about G. This is a very different question; it is not about frequency but about strength of means (cause). Most causal theorists insist we keep these questions strictly apart because they rest on different probabilistic assumptions and demand different probability measures (Galavotti, 2011). It may be that both Audi and Hitchcock have something like gradation in mind; they both speak of means as *contributing* to bringing about the goal. Even Tyler (1949) speaks probabilistically; clause 2 in his rationale asks what educational experiences are *likely* to attain the goals. It is not clear, however, which of the two senses of probability he has in mind.

Next we have the permissibility premise, which says that M1 should not violate applicable moral or institutional norms. In most cases I would assume that this is unproblematic. Research into effective reading instruction, for example, seems not to touch on any ethical problems; the methods all seem permissible in that sense (e.g. Hatcher et al., 2006). I honestly cannot imagine any cases in which (quantitative) researchers would overlook such norms, whether inadvertently or on purpose. For Skjervheim, as we have seen, the case is rather that means-end

pedagogy itself is morally dubious, not that just the means is. For certain critics of EBP, things are different.

Let me begin with Ian Sanderson (2003), who argues that in education, instrumentality is not what matters, but rather what is appropriate. Apparently he assumes that the two are mutually exclusive: “Secondly, by conceiving of rationality in terms of means to given ends, [instrumental actions] neglect the ethical-moral dimension of problem solving” (p. 340). One can put this even stronger. Since evidence speaks solely to the effectiveness of a given strategy, EBP not only ignores but precludes questions of ethics. While Sanderson thinks that instrumental reasoning leaves no room for ethics, Hitchcock has built it explicitly into his reasoning scheme.

Also Gert Biesta (2007, 2010) has addressed this issue, in the context of the form of educational practice and professional action he takes to be entailed by EBP. As seen above, he takes an EBP form of practice to be technological, means and ends are sharply divided, and the only relevant questions concern the effectiveness of the means in achieving the ends. One of the problems with this view, he says, is that even if we could identify a most effective means, we might still decide not to act accordingly. There is always the question of whether our interventions are desirable, that is, morally acceptable, in themselves. In other words, Biesta says we should consider the permissibility of the proposed means, and reject it if it violates our moral norms. But why does he refer to this as a “problem”? The answer is that he thinks of it as a criticism of EBP, since EBP in his definition of it precludes considerations of the permissibility of means. In Biesta’s view educational practice is non-causal and moral in nature, professional judgments are normative rather than instrumental, and means and ends are internally related. But the real trouble about trying to frame educational practice as EBP is that EBP holds effective means, once they have been shown to be effective, to be mandatory:

I have argued that to suggest that research about “what works” can replace such judgments not only implies an unwarranted leap from “is” to “ought”, but also denies educational practitioners the right *not* to act according to evidence about “what works” if they judge that such a line of action would be educationally undesirable (2007, p. 20).

This is reminiscent of presumptive reasoning; that the fact that some means will achieve a goal establishes a presumption that the agent *should* perform it. Christian Kock (2007) describes it as “a type of argumentation midway between assertion and assumption: in its basic form, a proponent offers an argument for a claim, and this argument is seen as sufficient to shift the burden of proof to those who want to question the claim. [...] The opponent/respondent must either (presumptively) accept the claim or rebut the argument” (p. 91). It seems that Biesta’s argument is a form of presumptive reasoning; if there exists evidence that some method works, you simply must accept it and also act on it – presumably, if you wish to question it you must provide even better evidence. But in fact, Biesta intimates, you are not even given the opportunity to question it or to refuse to use it on ethical grounds. As far as I can see, the minimalist conception of EBP contains no such idea, and it is

unclear on what grounds Biesta ascribes such a view to EBP. Moreover, Kock refutes the idea that the mere existence of a possible effective means establishes a presumption that it should – let alone must – be used.

However, if we are unhappy with means M1, we can always look to alternative means. This is not, for example, part of Skjervheim's discussion; he discusses means-end as if there is only one means to the goal, and this means is sufficient (and perhaps necessary). On Hitchcock's view, we should compare M1 with other possible means and our choice of M1 should be an "all things considered" decision where we take ethical, empirical, economical and other practical issues into consideration.

Lastly, there is the side effects premise. M1 could have negative side effects, Hitchcock argues, and if we want to bring about M1 we should make sure that possible side effects do not outweigh the benefit of attaining goal G. Such considerations and weighings might evidently be highly complicated. Neither Biesta nor Skjervheim takes this problem into account. In fact, it would be strange if Biesta did, since he also argues that existence of means implies that practitioners have no right not to use it – that does not point in the direction of worries about possible side effects. And then, finally, after having been through this scheme, we are in a position to decide to bring about M1 in order to achieve goal G. As we can see, means-end reasoning as Hitchcock presents it is much more complex than means-end reasoning as it is presented in educational contexts.

3.3 PBIS: an example of EBP

It seems to me that Hitchcock's scheme does capture much of the means-end reasoning involved in EBP; possibly with some differences. First, it does seem clear that in EBP the relation between means and end is instrumental and external – means and end are independent of each other. We have a goal, and the job of the research is to find effective means. The evidence in question should support the claim that the means is in fact effective. Let us look at an example.

Let me introduce a Norwegian version of PBIS (School-Wide Positive Behavior Intervention and Support). This is an intervention with two parallel aims; to prevent problem behavior and to enhance social competence (Arnesen, Ogden, & Sørli, 2006). In this case, the intervention is the means, and the evidence is evidence of its effectiveness. This is very far from being a simple means. The intervention consists of a number of smaller intervention components each targeted at specific (intermediate) goals, and the level of detail is great indeed. The overall intervention may last for at least a school-year and requires the cooperation and dedication of all involved parties, from headmaster to teachers and parents. The intervention is adapted to the characteristics of the school, but within certain limits: the components remain the same (they have been shown to work, after all) and they are to be implemented in the order and the manner decided by the "owners" of the intervention (the researchers or the developers). And here we find a difference from Hitchcock's means-end scheme: if the school decides to try PBIS to solve its problems, the users do not get to choose how it should be implemented. One thing is to have evidence for the effectiveness of the means; another thing is the

implementation of the means. Quality of implementation is of immense importance in EBP – the evidence may correctly show the intervention to be effective, but if it is implemented poorly the goal may not be achieved after all. If the intervention is implemented differently from what the developers have planned, we can no longer know exactly *what* it is that works, and the point of EBP is lost. In a sense we might say here that the teachers themselves do not reason from end to means, somebody has already done it for them. The freedom teachers traditionally have had to choose method of instruction is gone. If you adopt PBIS, you commit to playing on the developers' home ground and by their rules.

It is also worth mentioning that in EBP, as exemplified by PBIS, the means is thought to be general. The intervention in question works in general, not just in one school. Hitchcock's scheme is general enough to cover this type of cases, although he presents it in the context of solo means-end reasoning in particular circumstances C. Other than the above, we find that Hitchcock's premises are by and large satisfied. The PBIS literature is blatantly causal, albeit without using the terms 'causal' or 'cause'. The authors employ a wide variety of causal words, e.g. prevent, bring about, enhance, lead to, intervention, learning effects and influence. They think in terms of causal chains and intermediate goals. It is intimated that the connections are thought to be highly probable, but nowhere do they discuss causal necessity or sufficiency. As an aside: PBIS is also blatantly behaviorist, based as it is on Skinnerian operant conditioning – a feature that in itself would have made it dubious to thinkers such as Skjervheim. Contrary to what Biesta thinks about EBP in general, they explicitly discuss the permissibility premise, including a consideration of possible side effects and of the worthiness of the goals. They have long discussions about implementation, not only about its quality, but also about possible enabling and disabling factors in the existing school structure. They do not consider alternative means – unless you count the school's old practice as an alternative means. If so, this is a means that has shown itself not to work or to produce downright bad results in the form of problematic behavior and low social competence. Still, we can picture the school personnel running through a scheme like Hitchcock's to evaluate PBIS and conclude that they wish to implement PBIS as M1 to solve a problem and attain the goal of improved social skills.

4. GOAL-DIRECTED THEORIES

Goal-directed theories represent a different way of thinking about the problem of how to achieve a goal. They have features in common with means-end pedagogy, but they also have certain distinctive features that make them interesting to explore in relation to EBP.

Historically, educational theories were simply thought to be practical and goal-directed, since education is a practical and goal-directed discipline. While philosophers of education took their point of departure in educational practice (the subject of educational thought) in their discussions about the nature of educational theories, the concept of a goal-directed theory comes from the semantic conception of scientific theories, where it is analyzed as one of several possible theory structures (Suppe, 1989). Typically, goal-directed educational theories are

normative; they involve a more or less clearly defined goal and an account of how to achieve it (Norris & Kvernbekk, 1997). The basic idea of any goal-directed theory is that the “teleological entity” in question (the entity for whom the goal is set: an individual student, a class, an organization, and so forth) changes toward the goal partly as a function of its interaction with an environment. The tendency toward a goal presupposes interaction with a *stable* environment; if the environment is unstable the goal may never be achieved. Consequently one may seek to influence the environment, e.g. by stabilizing and structuring it. This is precisely what goal-directed educational theories do, they tell us how we should arrange the environment in order to ensure an interaction that will further the tendency toward the goal; that is, maximize the probability of attaining the goal.

There is evidently something of the means-end relationship here, but there are also differences. We find goals here, and they might be defined in any way, from vaguely formulated over-arching ones to highly specified outcomes. The difference would seem to lie in the conception of means. It is not obvious that the distinctions and properties that belong to “traditional” means-end reasoning are at work here, at least not in the same sense. Let me develop a couple of points.

I would like to begin with Hitchcock’s concluding decision, which is to bring about M1. Importantly, he states that M1 needs to be *within the power* of the relevant agent. In everyday means-end reasoning the agent who acts (assuming that M1 is an action) is the same person that has the goals – the agent want to achieve goals for him- or herself. This is not the case in education; here the agent who deliberates about means and settles on bringing about M1 would be a teacher, but the goals are for the students. In Skjervheim’s version of means-end pedagogy the means produces the end, such that the agent who controls the means also controls the end. And that is the teacher – the student is more of a “black-box”. But in goal-directed theories this is different. Here the student changes toward the goal at least partly as a function of his/her own interaction with the environment. So what, exactly, constitutes the means here, and in whose power is it? If M1 is the teacher’s action, it is obviously within the teacher’s power to bring it about, but if the student interacts with the teacher the effects of this action may be tempered or counteracted or enhanced. If M1 is the interaction between student and teacher, then obviously the teacher cannot bring it about alone. If M1 is the learning environment itself, it is partly within the teacher’s power, but equally much within the students’ power (since the students are part of the environment). It could be that we have to conclude that on this view; ultimately M1 is within the power of the student.

Interestingly, Tyler’s views can be interpreted as being more in keeping with goal-directed theory than with the means-end pedagogy he is normally associated with. Recall the second and third clause of his rationale: what learning experiences are likely to attain the selected goals and how they could be effectively organized. In his discussion of the second clause he says,

The term “learning experience” is not the same as the content with which a course deals nor the activities performed by the teacher. The term “learning experience” refers to the interaction between the learner and the external conditions in the environment to which he can react (Tyler, 1949, p. 63).

The teacher can organize the external conditions so as to increase the probability that the experiences reinforce each other rather than nullify each other, on the principles of continuity, sequence and integration. Tyler appreciates that changes in ways of thinking develop slowly, and argues that evaluation must involve testing over a period of time to determine whether the desired changes in student behavior are actually taking place (p. 106).

Where is EBP in all this? Biesta attributes to EBP a view of means-end that is akin to Skjervheim's view of means-end pedagogy: external means and totally passive students. I think the picture is blurred. If we look again at PBIS, there can be no doubt that Arnesen, Ogden and Sørliie think that the intervention, correctly implemented, is sufficient for the goals. At the same time they explicitly say that the intervention components are mediated through the social normative fabric of the school, and the students not only interact with this fabric, they contribute to making it what it is. But the means, if we by that understand the intervention, is in the power of the developers. If we understand the means to be the interaction between students and intervention components, I would say it is partly within the power of the students.

Second, it is unclear where this analysis leaves the discussion of means as constitutive (internal) or instrumental (external). It does not sound right to say that the interaction of student and environment is constitutive of the goal. If the interaction happens to instantiate the goal, the student can hardly be described as changing toward it. It may be that goal-directed theories simply do not quite accommodate the traditional means-end vocabulary. However, some form of causality seems to be involved, although we may have to understand that too as somehow inherent in the interaction between student and environment. The issue of probability is nicely taken care of in this approach. We can view the process of change toward the goal, whether described as learning, development, socialization or *Bildung*, as deterministic or indeterministic. Change here is understood as the sequences of change in states that the "teleological entity" in question undergoes on its path toward the goal. If it is deterministic, the current state of the "entity" determines unique subsequent states. If it is indeterministic, which it surely is in educational contexts, then for any given current state the "entity" may assume a number of different subsequent states, and the theory assigns probabilities that these possible subsequent states will be assumed. This idea seems to be parallel to Hitchcock's achievability premise, which states that we are dealing with causal sequences and that achievability may be a matter of possibility and probability rather than universality.

Third, a major point in goal-directed theories is that the environment with which the student interacts is stable – goal attainment relies on this feature of the environment. The role accorded to *environment* on the whole sets this approach apart from means-end pedagogy and by and large EBP. The problem with means-end pedagogy may thus not be so much that it is instrumental and causal, but that it ignores the function of the environment. Skjervheim, for example, clearly takes the means-end relation to be independent of the environment in which it takes place, and the same is generally the case in EBP concerning the relation between

intervention and effect. These regularities can therefore be applied everywhere with much the same result. This holds for PBIS as well, even given the authors' acknowledgement that the intervention works through the social structure. The intervention–effect relationship holds generally and is thus principally independent of the circumstances – this is a presupposition underlying all EBP.

But what if we stand these things on their head? The nature of goal-directed theories seems to suggest that the environment is if not primary, then at least of prime importance. And could we not think that the intervention–effect (means-end) relation does not hold *simpliciter*, but rather relative to the environment, as we have seen that Cartwright argues for causal connections in general? If so, the nature and the stability of the environment becomes an acute problem for the implementation of evidence-based interventions. It is not enough that the cause-effect relation is stable, since its stability depends on the stability of the environment. The existing environment would thus have to support (at least not counteract) the causal relation in question, and it would need to be stable in order that the causal relation can persist and the effect be produced.

5. CONCLUSION

I have in this paper discussed how means-end reasoning plays out in evidence-based practice in education. As usual, the topic proved to be larger and have more “nooks and crannies” than anticipated.

Means-end reasoning is central to practical pedagogy, yet it is heavily criticized. Much of this criticism, I have argued, is due to misunderstandings about the nature of the means-end relationship – for instance, that it is technological, universal, positivist and entails reification of the students. It is fascinating how such views still abound in educational literature, especially in the EBP debate. One of the criticisms is that means-end gives an over-simplified and thoroughly instrumental view of practice and the professional judgments of teachers, and that EBP should be rejected because that kind of instrumentality is all it involves. I think that is wrong. It is also wrong that means-end thinking is simplistic. Audi's discussion about means and ends shows it to be a highly complex reasoning process, and Hitchcock's means-end scheme accommodates many of the issues that EBP critics say means-end neglects and even precludes, such as considerations of the (ethical) permissibility of the means.

But complex as Hitchcock's scheme is, it does not (at least not in its present form) accommodate a feature of education that seems to be of some importance: what brings the student toward the goal is, at least in part, the interaction between student and environment. This feature is explicitly brought to the fore in goal-directed theories. This has implications for the control of the means, and it points to certain problems in pinpointing exactly what the means *is*. The teacher's action? The material conditions of the learning environment? The interaction of student and environment? It is not evident that a general means-end reasoning scheme needs to accommodate this particular educational feature, but EBP in education surely should – and it is not clear that it does. There is a tendency, it seems to me, that cases of EBP in education assume that the intervention–effect

relationship is basic, general and therefore exists independently of the context. This is a comfortable view since it allows the control of the means to remain within the hands of the adults; whether teachers or intervention developers.

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